

Inference at * 2
of proof for Lemma adjacent-append:

1. $T : \text{Type}$
2. $x : T$
3. $y : T$
4. $L_1 : T \text{ List}$
5. $L_2 : T \text{ List}$
6. $(\exists i : \{0..(\|L_1\| - 1)\}^- . (x = L_1[i] \ \& \ y = L_1[(i+1)]))$
 $\vee ((0 < \|L_1\|) \ \& \ (0 < \|L_2\|) \ \& \ x = \text{last}(L_1) \ \& \ y = \text{hd}(L_2))$
 $\vee (\exists i : \{0..(\|L_2\| - 1)\}^- . (x = L_2[i] \ \& \ y = L_2[(i+1)]))$

$\vdash \exists i : \{0..(\|L_1 @ L_2\| - 1)\}^- . (x = (L_1 @ L_2)[i] \ \& \ y = (L_1 @ L_2)[(i+1)])$
by ((SplitOrHyps)
CollapseTHEN (ExRepD)).

1:

6. $i : \{0..(\|L_1\| - 1)\}^-$
7. $x = L_1[i]$
8. $y = L_1[(i+1)]$

$\vdash \exists i : \{0..(\|L_1 @ L_2\| - 1)\}^- . (x = (L_1 @ L_2)[i] \ \& \ y = (L_1 @ L_2)[(i+1)])$

2:

6. $0 < \|L_1\|$
7. $0 < \|L_2\|$
8. $x = \text{last}(L_1)$
9. $y = \text{hd}(L_2)$

$\vdash \exists i : \{0..(\|L_1 @ L_2\| - 1)\}^- . (x = (L_1 @ L_2)[i] \ \& \ y = (L_1 @ L_2)[(i+1)])$

3:

6. $i : \{0..(\|L_2\| - 1)\}^-$
7. $x = L_2[i]$
8. $y = L_2[(i+1)]$

$\vdash \exists i : \{0..(\|L_1 @ L_2\| - 1)\}^- . (x = (L_1 @ L_2)[i] \ \& \ y = (L_1 @ L_2)[(i+1)])$